

#### § 531.4

##### § 531.4 Definitions.

(a) *Statutory terms.* (1) The terms *average fuel economy*, *manufacture*, *manufacturer*, and *model year* are used as defined in section 501 of the Act.

(2) The terms *automobile* and *passenger automobile* are used as defined in section 501 of the Act and in accordance with the determination in part 523 of this chapter.

(b) *Other terms.* As used in this part, unless otherwise required by the context—

#### 49 CFR Ch. V (10–1–20 Edition)

(1) *Act* means the Motor Vehicle Information and Cost Savings Act, as amended by Pub. L. 94–163.

##### § 531.5 Fuel economy standards.

(a) Except as provided in paragraph (f) of this section, each manufacturer of passenger automobiles shall comply with the fleet average fuel economy standards in Table I, expressed in miles per gallon, in the model year specified as applicable:

**TABLE I**

Model year	Standard
1978.....	18.0
1979.....	19.0
1980.....	20.0
1981.....	22.0
1982.....	24.0
1983.....	26.0
1984.....	27.0
1985.....	27.5
1986.....	26.0
1987.....	26.0
1988.....	26.0
1989.....	26.5
1990-2010.....	27.5

(b) For model year 2011, a manufacturer's passenger automobile fleet shall comply with the fleet average fuel economy level calculated for that model year according to Figure 1 and the appropriate values in Table II.

**Figure 1:**

$$Required\_Fuel\_Economy\_Level = \frac{N}{\sum_i \frac{N_i}{T_i}}$$

Where:

$N$  is the total number (sum) of passenger automobiles produced by a manufacturer;

$N_i$  is the number (sum) of the  $i$ th passenger automobile model produced by the manufacturer; and

$T_i$  is the fuel economy target of the  $i$ th model passenger automobile, which is determined according to the following formula, rounded to the nearest hundredth:

$$T = \frac{1}{\frac{1}{a} + \left(\frac{1}{b} - \frac{1}{a}\right) \frac{e^{(x-c)d}}{1 + e^{(x-c)d}}}$$

Where:

Parameters  $a$ ,  $b$ ,  $c$ , and  $d$  are defined in Table II;

$e = 2.718$ ; and

$x$  = footprint (in square feet, rounded to the nearest tenth) of the vehicle model.

TABLE II—PARAMETERS FOR THE PASSENGER AUTOMOBILE FUEL ECONOMY TARGETS

Model year	Parameters			
	$a$ (mpg)	$b$ (mpg)	$c$ (gal/mi/ft <sup>2</sup> )	$d$ (gal/mi)
2011 .....	31.20	24.00	51.41	1.91

(c) For model years 2012–2026, a manufacturer's passenger automobile fleet shall comply with the fleet average fuel economy level calculated for that

model year according to this Figure 2 and the appropriate values in this Table III.

**Figure 2:**

$$CAFE_{required} = \frac{\sum_i PRODUCTION_i}{\sum_i \frac{PRODUCTION_i}{TARGET_i}}$$

Where:

$CAFE_{required}$  is the fleet average fuel economy standard for a given fleet (domestic passenger automobiles or import passenger automobiles);

Subscript  $i$  is a designation of multiple groups of automobiles, where each group's designation, *i.e.*,  $i = 1, 2, 3$ , etc., represents automobiles that share a unique model type and footprint within the applicable fleet, either domestic passenger automobiles or import passenger automobiles;

$Production_i$  is the number of passenger automobiles produced for sale in the United

States within each  $i$ th designation, *i.e.*, which share the same model type and footprint;

$TARGET_i$  is the fuel economy target in miles per gallon (mpg) applicable to the footprint of passenger automobiles within each  $i$ th designation, *i.e.*, which share the same model type and footprint, calculated according to Figure 3 and rounded to the nearest hundredth of a mpg, *i.e.*,  $35.455 = 35.46$  mpg, and the summations in the numerator and denominator are both performed over all models in the fleet in question.

**Figure 3:**

$$TARGET = \frac{1}{MIN \left[ MAX \left( c \times FOOTPRINT + d, \frac{1}{a} \right), \frac{1}{b} \right]}$$

Where:

$TARGET$  is the fuel economy target (in mpg) applicable to vehicles of a given footprint ( $FOOTPRINT$ , in square feet);

Parameters  $a, b, c$ , and  $d$  are defined in Table III; and

The  $MIN$  and  $MAX$  functions take the minimum and maximum, respectively, of the included values.

TABLE III—PARAMETERS FOR THE PASSENGER AUTOMOBILE FUEL ECONOMY TARGETS, MYS 2012–2026

Model year	Parameters			
	$a$ (mpg)	$b$ (mpg)	$c$ (gal/mi/ft <sup>2</sup> )	$d$ (gal/mi)
2012 .....	35.95	27.95	0.0005308	0.006057
2013 .....	36.80	28.46	0.0005308	0.005410
2014 .....	37.75	29.03	0.0005308	0.004725
2015 .....	39.24	29.90	0.0005308	0.003719
2016 .....	41.09	30.96	0.0005308	0.002573
2017 .....	43.61	32.65	0.0005131	0.001896
2018 .....	45.21	33.84	0.0004954	0.001811
2019 .....	46.87	35.07	0.0004783	0.001729
2020 .....	48.74	36.47	0.0004603	0.001643
2021 .....	49.48	37.02	0.000453	0.00162
2022 .....	50.24	37.59	0.000447	0.00159
2023 .....	51.00	38.16	0.000440	0.00157
2024 .....	51.78	38.74	0.000433	0.00155
2025 .....	52.57	39.33	0.000427	0.00152
2026 .....	53.37	39.93	0.000420	0.00150

(d) In addition to the requirements of paragraphs (b) and (c) of this section, each manufacturer shall also meet the minimum fleet standard for domesti-

cally manufactured passenger automobiles expressed in Table IV:

§ 531.5

TABLE IV—MINIMUM FUEL ECONOMY STANDARDS FOR DOMESTICALLY MANUFACTURED PASSENGER AUTOMOBILES, MYS 2011–2026

Model year	Minimum standard
2011 .....	27.8
2012 .....	30.7
2013 .....	31.4
2014 .....	32.1
2015 .....	33.3
2016 .....	34.7
2017 .....	36.7
2018 .....	38.0
2019 .....	39.4
2020 .....	40.9
2021 .....	39.9
2022 .....	40.6
2023 .....	41.1
2024 .....	41.8
2025 .....	42.4
2026 .....	43.1

(e) The following manufacturers shall comply with the standards indicated below for the specified model years:

(1) Avanti Motor Corporation.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1978 .....	16.1
1979 .....	14.5
1980 .....	15.8
1981 .....	18.2
1982 .....	18.2
1983 .....	16.9
1984 .....	16.9
1985 .....	16.9

(2) Rolls-Royce Motors, Inc.

Model year	Average fuel economy standard (miles per gallon)
1978 .....	10.7
1979 .....	10.8
1980 .....	11.1
1981 .....	10.7
1982 .....	10.6
1983 .....	9.9
1984 .....	10.0
1985 .....	10.0
1986 .....	11.0
1987 .....	11.2
1988 .....	11.2
1989 .....	11.2
1990 .....	12.7
1991 .....	12.7
1992 .....	13.8
1993 .....	13.8
1994 .....	13.8
1995 .....	14.6
1996 .....	14.6
1997 .....	15.1
1998 .....	16.3
1999 .....	16.3

(3) Checker Motors Corporation.

49 CFR Ch. V (10–1–20 Edition)

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1978 .....	17.6
1979 .....	16.5
1980 .....	18.5
1981 .....	18.3
1982 .....	18.4

(4) Aston Martin Lagonda, Inc.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1979 .....	11.5
1980 .....	12.1
1981 .....	12.2
1982 .....	12.2
1983 .....	11.3
1984 .....	11.3
1985 .....	11.4

(5) Excalibur Automobile Corporation.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1978 .....	11.5
1979 .....	11.5
1980 .....	16.2
1981 .....	17.9
1982 .....	17.9
1983 .....	16.6
1984 .....	16.6
1985 .....	16.6

(6) Lotus Cars Ltd.

Model year	Average fuel economy standard (miles per gallon)
1994 .....	24.2
1995 .....	23.3

(7) Officine Alfieri Maserati, S.p.A.

AVERAGE FUEL ECONOMY STANDARD

Model year	Miles per gallon
1978 .....	12.5
1979 .....	12.5
1980 .....	9.5
1984 .....	17.9
1985 .....	16.8

(8) Lamborghini of North America.

**Nat'l Highway Traffic Safety Admin., DOT**

**§ 531.6**

**AVERAGE FUEL ECONOMY STANDARD**

Model year	Miles per gallon
1983 .....	13.7
1984 .....	13.7

(9) LondonCoach Co., Inc.

**AVERAGE FUEL ECONOMY STANDARD**

Model year	Miles per gallon
1985 .....	21.0
1986 .....	21.0
1987 .....	21.0

(10) Automobili Lamborghini S.p.A./  
Vector Aeromotive Corporation.

Model year	Average fuel economy standard (miles per gallon)
1995 .....	12.8
1996 .....	12.6
1997 .....	12.5

(11) Dutcher Motors, Inc.

Model year	Average fuel economy standard (miles per gallon)
1986 .....	16.0
1987 .....	16.0
1988 .....	16.0
1992 .....	17.0
1993 .....	17.0
1994 .....	17.0
1995 .....	17.0

(12) MedNet, Inc.

Model year	Average fuel economy standard (miles per gallon)
1996 .....	17.0
1997 .....	17.0
1998 .....	17.0

(13) Vector Aeromotive Corporation.

Model year	Average fuel economy standard (miles per gallon)
1998 .....	12.1

(14) Qvale Automotive Group Srl.

Model year	Average fuel economy standard (miles per gallon)
2000 .....	22.0
2001 .....	22.0

(15) Spyker Automobielen B.V.

**AVERAGE FUEL ECONOMY STANDARD**

Model year	Miles per gallon
2006 .....	18.9
2007 .....	18.9

[43 FR 28204, June 29, 1978]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting § 531.5, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at [www.govinfo.gov](http://www.govinfo.gov).

**§ 531.6 Measurement and calculation procedures.**

(a) The fleet average fuel economy performance of all passenger automobiles that are manufactured by a manufacturer in a model year shall be determined in accordance with procedures established by the Administrator of the Environmental Protection Agency under 49 U.S.C. 32904 and set forth in 40 CFR part 600. For model years 2017 to 2026, a manufacturer is eligible to increase the fuel economy performance of passenger cars in accordance with procedures established by the EPA set forth in 40 CFR part 600, subpart F, including any adjustments to fuel economy the EPA allows, such as for fuel consumption improvements related to air conditioning efficiency and off-cycle technologies.

(1) A manufacturer that seeks to increase its fleet average fuel economy performance through the use of technologies that improve the efficiency of air conditioning systems must follow the requirements in 40 CFR 86.1868–12. Fuel consumption improvement values resulting from the use of those air conditioning systems must be determined in accordance with 40 CFR 600.510–12(c)(3)(i).

(2) A manufacturer that seeks to increase its fleet average fuel economy performance through the use of off-cycle technologies must follow the requirements in 40 CFR 86.1869–12. A